CLAIMS

What is claimed is:

1. A method for repairing a coated component, which has been exposed to engine operation, comprising:

a) providing an engine run component including a base metal substrate having thereon a bond coat;

b) removing the bond coat, wherein a portion of the base metal substrate between about 1-3 mils in thickness also is removed to create a remaining base metal substrate of reduced thickness;

c) applying a lower growth environmental bond coating to the remaining base metal substrate comprising an alloy having an aluminum content of about 10-60 atomic percent so that upon subsequent repair of the component, less than about 1-3 mils in thickness of the remaining base metal substrate is removed because of less environmental coating growth into the substrate than the prior bond coat, thereby extending component life and increasing repairability of the component.

2. The method of claim 1, wherein not more than about 1 mil in thickness of the remaining base metal substrate of c) is removed.

3. The method of claim 1, wherein the bond coat of a) is a diffusion bond coating.

4. The method of claim 3, wherein the environmental bond coating of c) has an integrated aluminum level less than about 2250μm*at.% Al.

5. The method of claim 1, wherein thickness of the environmental coating of c) is controlled to produce an integrated aluminum level of less than or equal to about 4000 μm*at.% Al, and the environmental coating comprises a β-NiAl overlay coating.

6. The method of claim 1, wherein thickness of the environmental bond coating of c) is controlled to produce an integrated aluminum level of less than or equal to about 4000 μm*at.% Al.

7. The method of claim 6, wherein the environmental bond coating is an MCrAlY coating applied to a thickness range not exceeding between about 3-8 mils, wherein M is selected from the group consisting of Ni, Fe, Co and combinations thereof, with Cr and Y being optional.

8. The method of claim 2, wherein thickness of the environmental bond coating of c) is controlled to produce an integrated aluminum level of less than or equal to about 4000 μm*at.% Al.

9. The method of claim 8, wherein the environmental bond coating comprises a material selected from the group consisting of Ni, Al, Cr, reactive elements, noble metals and combinations thereof.

10. The method of claim 1, wherein the component is a gas turbine engine component.

11. The method of claim 4, wherein the environmental bond coating is a diffusion coating.

12. The method of claim 11, wherein the diffusion coating comprises an aluminide diffusion coating.

13. The method of claim 11, wherein the diffusion coating comprises a PtAl diffusion coating.

14. A repaired component comprising:

an engine run component having a base metal substrate, a portion of the base metal substrate between about 1-3 mils in thickness and an overlying bond coat having been removed to create a remaining base metal substrate of reduced thickness;

a lower growth environmental bond coating comprising an alloy having an aluminum content of about 10-60 atomic percent applied to the remaining base metal substrate so that upon subsequent repair of the component, less than about 1-3 mils in thickness of the remaining base metal substrate is removed because of less

environmental coating growth into the substrate than the prior bond coat, thereby extending component life and increasing repairability of the component.

15. The repaired component of claim 14, wherein not more than about 1 mil in thickness of the remaining base metal substrate is removed.

16. The repaired component of claim 14, wherein the overlying bond coat is a diffusion bond coating.

17. The repaired component of claim 16, wherein the environmental bond coating has an integrated aluminum level less than about 2250μm*at.% Al.

18. The repaired component of claim 14, wherein thickness of the environmental bond coating is controlled to produce an integrated Al level of less than or equal to about 4000μm*at.% Al and the environmental bond coating comprises a β-NiAl coating.

19. The repaired component of claim 14, wherein thickness of the environmental bond coating is controlled to produce an integrated aluminum level of less than or equal to about 4000μm*at.%Al.

20. The repaired component of claim 19, wherein the environmental bond coating is an MCrAlY coating applied to a thickness range not exceeding between about 3-8 mils, wherein M is selected from the group consisting of Ni, Fe, Co and combinations thereof, with Cr and Y being optional.

21. The repaired component of claim 19, wherein the environmental coating bond comprises a material selected from the group consisting of Ni, Al, Cr, reactive elements, noble metals and combinations thereof.

22. The repaired component of claim 14, wherein the component is a gas turbine engine component.

23. The repaired component of claim 17, wherein the environmental bond coating is a diffusion coating.

24. The repaired component of claim 23, wherein the diffusion coating comprises an aluminide coating.

25. The repaired component of claim 10, wherein the diffusion coating comprises a PtAl aluminide coating.

26. A repaired component comprising:

an engine run component having a base metal substrate, a portion of an overlying bond coat on the substrate having been removed;

a lower growth environmental bond coating comprising an alloy having an aluminum content of about 10-60 atomic percent applied to the substrate so that upon subsequent repair of the component, less than about 1-3 mils in thickness of the base metal substrate is removed because of less environmental bond coating growth into the substrate than the prior bond coat, thereby extending component life and increasing repairability of the component.

27. A repaired gas turbine engine component comprising:

an engine run gas turbine engine component having a base metal substrate, a portion of the base metal substrate between about 1-3 mils in thickness and an overlying bond coat having been removed to create a remaining base metal substrate of reduced thickness;

a lower growth environmental bond coating comprising an alloy having an aluminum content of about 10-60 atomic percent applied to the remaining base metal substrate so that upon subsequent repair of the component, less than about 1-3 mils in thickness of the remaining base metal substrate is removed because of less environmental coating growth into the substrate than the prior bond coat, thereby extending component life and increasing repairability of the component, wherein thickness of the environmental bond coating is controlled to produce an integrated aluminum level of less than or equal to about 4000μm*at.% Al, wherein the environmental bond coating comprises a β-NiAl overlay alloy.